## REMARKS

Claims 1-21 are pending in the present application with claims 1, 5, 11 and 14 amended and claims 2 and 3 cancelled. Applicant acknowledges with appreciation the allowance of claims 12, 13 and 15-21. Reexamination and reconsideration of the rejected claims, as amended, are respectfully requested.

Applicant has amended the specification to correct a number of grammatical and typographical errors. These amendments include the deletion of the word "momently" as referenced in paragraph one of the Office Action. Applicant, however, has not amended the word "cancelling" on page 18, line 25, as requested by the Examiner, because "cancelling" is not misspelled. See Merriam-Webster's Collegiate Dictionary (Tenth Edition).

Applicant has amended the abstract to mention "volume" in the abstract as requested by the Examiner.

The Examiner stated that the title of the invention is not descriptive and suggested "Device and Method for Analyzing and Representing Sound Signals in Musical Notation." The title has been amended accordingly.

The Examiner objected to the specification on the basis that the term "operator member" in claim 5 is not explained in the specification. Claim 5 was also rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as his invention. The Examiner contends that the accepted meaning of "operator member" is a "body part." Given that the word "member" may refer to a body part, Applicant has amended claim 5 by deleting the word "member." Accordingly, Applicant respectfully submits that the objection to the specification and the rejection of claim 5 should be withdrawn.

The Examiner rejected claims 1-5, 11 and 14 under 35 U.S.C. 103(a) as being unpatentable over Kohler (U.S. Patent No. 6,140,568). The Examiner rejected claims 6-10 under 35 U.S.C. § 103 as being unpatentable over Kohler in view of Humphrey et al. (U.S. Patent

No. 3,894,186) (hereinafter "Humphrey"). These rejections are respectfully traversed, and support for Applicant's argument is detailed below.

The present invention, as set forth in claim 1, is directed to a sound signal analyzing device that analyzes an input sound signal. As a preliminary operation prior to the sound signal analysis, a characteristic of the received sound signal is extracted and various parameters for use in the analysis of that sound signal are set in accordance with the extracted characteristic. Thus, the present invention, as set forth in claim 1, is directed at how to set parameters to be used in the sound signal analysis rather than the sound signal and analysis scheme, itself.

Claim 1 has been amended to recite the features of claims 2 and 3 (which have been accordingly cancelled). That is, amended claim 1 recites that the extracted characteristic is at least one of the volume level and the upper and lower pitch limits of the sound signal. A threshold value for use in the analysis of the sound signal is set in accordance with the extracted volume level. A filter characteristic for use in the analysis of the sound signal is set in accordance with the extracted upper and lower limits. Claims 11 and 14 -- which correspond to claim 1 and are directed to a method and a machine-readable medium, respectively -- have been similarly amended.

In rejecting claims 1 (and its dependant claims 2-5), 11 and 14, the Examiner cited Kohler. Kohler discloses a system and method for identifying a plurality of frequencies simultaneously present in an audio signal. An input sound signal in decomposed into sine wave components, and then a fundamental wave is extracted by removing harmonies from the decomposed sine wave components on the basis of set parameters.

Kohler, however, does not set forth in detail the manner for setting the parameters. The sections of Kohler cited by the Examiner in the Office Action (see paragraphs 10-15) as rendering claims 1-5, 11 and 14 unpatentable merely disclose the sound signal analyzing method, itself, and do not disclose the manner of setting the parameters for the sound signal analysis of the present invention as set forth in claims 1-5, 11 and 14. For example, col. 3, lines 52-55 of

Kohler cited by the Examiner summarily refers to filtering out non-pitched content and does not disclose a characteristic extraction section extracting upper and lower limits of the sound signal, itself, with a setting section setting a filter characteristic to analyze the sound signal in accordance with the limits. Accordingly, claims 1-5, 11 and 14 are patentable in view of Kohler.

The Examiner rejected claims 6 and its dependent claims 7-10 under § 103(a) as being unpatentable over Kohler in view of Humphrey. Aside from an input section and a pitch extraction section, claim 6 further recites a scale designation section and a note determination section. When a note name is to be determined on the basis of a pitch of a sound signal extracted by the pitch extraction section, the note name is determined in accordance with a scale determining condition set by the scale designation section such that the determined pitch corresponds to any one of the scale notes.

Kohler does not disclose a scale designation section as recognized by the Examiner (see paragraph 17 of the Office Action) nor does it disclose a note determination section that operates in accordance with a scale determining condition set by the scale designation section. The other cited reference, Humphrey, does not make up for the deficiencies of Kohler.

Humphrey relates to a tone analysis system with a visual display. As illustrated in fig. 1, a microphone 10 or other transducer provides the tones to be identified by the device disclosed in Humphrey. The to-be-identified tones are amplified, shaped and set to an optimum level and are inputted to a plurality of filters 30. The filters 30 are individually arranged to pass one of the tones of a musical scale. The output of each filter is connected to a lamp driver circuit 32 and a control is provided whereby the lamp driver circuits 32 will be activated only as long as a tone is being passed through the associated filter. The output of the lamp driver circuits are ultimately connected to lamps 42 on a display board, which will be lighted upon activation of the lamp driver circuit (see col. 2, line 53 to col. 3, line 23).

Humphrey further discloses sharp-flat matrix switches that change the routing of paths from lamp driver circuits to lamps (see col. 9, lines 57-67). For example, a switch 48 in fig. 1 is

operated to select whether the note should be displayed by illumination of the lamp for flat-added designation or by illumination of the lamps for sharp-added designation. That is, Humphrey merely discloses a selection via switch about a note having two designations, such as G flat and F sharp. In contrast, the present invention as set forth in claim 6 determines a note in accordance with a scale determining condition set by a scale designation section, such that the determined pitch corresponds to any one of the scale notes. Because Humphrey does not disclose this unique feature, claim 6 and its dependent claims are not unpatentable under § 103(a) over Kohler in view of Humphrey.

In view of the foregoing, Applicant respectfully submits that all of the rejected claims in the present application are in condition for allowance. Reexamination and reconsideration of these claims, as amended, are respectfully requested. If the Examiner feels that it would advance the prosecution of the application, it is respectfully requested that the Examiner telephone the undersigned attorney of record.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "**Version with markings to show changes made**".

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, Applicant petitions for any required relief including extensions of time and authorizes the Assistant Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952** referencing docket no. 39303.2009400. However, the Assistant Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

Respectfully submitted,

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## VERSION WITH MARKINGS TO SHOW CHANGES MADE

**In the Specification:**

Device and Method for Analyzing and Representing Sound Signals [Signal for Representing the Signal] in Musical Notation

Fig. 2 is a block diagram illustrating a general hardware setup of a personal computer that functions as a sound signal analyzing device in accordance with an embodiment of the present invention. This personal computer is controlled by a CPU 21, to which are connected, via a data and address bus 2P, various [carious] components, such as a program memory (ROM) 22, a working memory 23, an external storage device 24, a mouse operation detecting circuit 25, a communication interface 27, a MIDI interface 2A, a microphone interface 2D, a keyboard (K/B) operation detecting circuit 2F, a display circuit 2H, a tone generator circuit 2J and an effect circuit 2K. While the personal computer may include other hardware components, the personal computer according to this embodiment will be described below as only including these hardware resources essential for implementing various features of the present invention.

Further, the personal computer of Fig. 2 may be connected via the communication interface 27 to a communication network 28, such as a LAN (Local Area Network), the Internet or telephone line network, to exchange data (e.g., composition information with associated data) with a desired server [sever] computer. Thus, in a situation where the operating programs and various data are not contained in the personal computer, these operating programs and data can be downloaded from the server computer to the personal computer. Specifically, in such a case, the personal computer, which is a "client", sends a command to request the server computer 29 to download the operating programs and various data by way of the communication interface 27 and communication network 28. In response to the command, the server computer 29 delivers the requested operating programs and data to the personal computer via the communication

network 28. Then, the personal computer receives the operating programs and data via the communication interface 27 and stores them into the RAM 23 or the like. In this way, the necessary downloading of the operating programs and various data is completed.

Now, with reference to Figs. 1 and 3 to 10, a detailed description will be made about the exemplary behavior of the personal computer of Fig. 2 when it functions as the sound signal analyzing device. Fig. 1 is a flow chart of a main routine executed by the CPU 21 of the personal computer functioning as the sound signal analyzing device.

Next, in the main routine, a determination is made as to whether the level setting button 73A has been operated in the user setting area 73 of the parameter setting screen 70, and with an affirmative (YES) determination, a sound-volume threshold value setting process is carried out as shown in Fig. 4. In this sound-volume threshold value setting process, the dialog screen of Fig. 9 is displayed, and detection is made of a volume level of the vocal sound input via the microphone 2C. Then, the color of the level meter area 91 is varied in real time in accordance with the detected sound volume level. Displayed position of the pointer 92 indicating a maximum sound volume level, i.e., a criterion or reference level, is determined in the following manner. Namely, it is ascertained whether or not the currently-detected sound volume level is higher than the currently-set reference level. If so, the criterion or reference level, i.e., the maximum sound volume level, and the displayed position of the pointer 92 are changed in conformity to the currently detected sound volume level. If, on the other hand, the currently-detected sound volume level is lower than the current reference level, it is further determined whether the sound volume level has been found to be decreasing consecutively over the last n detections; if so (YES), the reference level, i.e., the maximum sound volume level, and the displayed position of the pointer 92 are changed in conformity to the currently-detected sound volume level. If the currently-detected sound volume level is lower than the current reference

level but the sound volume level has not necessarily been decreasing consecutively over the last n detections, it is further determined whether the sound volume level has been lower than a predetermined "a" value (e.g., 90% of the reference level) consecutively over the last m (m<n) detections; if so (YES), the reference level, i.e., the maximum sound volume level, and the displayed position of the pointer 92 are changed in conformity to the currently-detected sound volume level similarly to the above-mentioned. If, on the other hand, the sound volume level has not been lower than the "a" value consecutively over the last m detections, the current reference level is maintained. Through such a series of operations, the criterion or reference level, i.e., the maximum sound volume level, and the displayed position of the pointer 92 can be varied [momently]. The series of operations is repeated until the confirming (OK) button 95 is operated, upon which a sound volume threshold value, for use in pitch detection, key-on event detection or the like, is set in accordance with the maximum sound volume level (reference level) being displayed on the dialog screen of Fig. 9. For instance, a pitch detection process may be performed on sound signals having a volume level greater than the sound volume threshold value, or a process may be performed for detecting, as a key-on event, every detected sound volume level greater than the sound volume threshold value.

Sound signal is received which contains sound characteristics to be represented in musical notation. The characteristics, such as a volume level of the sound signal, are extracted out of the received sound signal, and various parameters for use in subsequent analysis of the sound signal are set in accordance with the extracted characteristics. Also, a desired scale determining condition is set by a user. Pitch of the sound signal is determined using the thus-set parameters. The determined pitch is rounded to any one of scale notes, corresponding to the user-set scale determining condition. Also, a given unit note length is set as a predetermined criterion or reference for determining a note length, and a length of the scale note determined

from the received sound signal is determined using the thus-set unit note length as a minimum determination unit, i.e., with an accuracy of the unit note length.

**In the Claims:**

1. (Amended) A sound signal analyzing device comprising:

an input section that receives a sound signal;

a characteristic extraction section that extracts a characteristic of the sound signal received by said input section; and

a setting section that sets various parameters for use in analysis of the sound signal received by said input section, in accordance with the characteristic of the sound signal extracted by said characteristic extraction section,

wherein said characteristic extraction section extracts at least one of a volume level of the sound signal and upper and lower pitch limits of the sound signal as said characteristic, and

wherein said setting section sets a threshold value for use in the analysis of the sound signal, in accordance with the volume level of the sound signal extracted by said characteristic extraction section, or said setting section sets a filter characteristic for use in the analysis of the sound signal, in accordance with the upper and lower pitch limits extracted by said characteristic extraction section.

5. (Amended) A sound signal analyzing device as recited in claim 4 wherein said setting section includes an operator [member] operable by a user, and said setting section, in response to operation of the operator [member] by the user, confirms the characteristic of the sound signal displayed by said display section and thereby sets a state of the characteristic as a predetermined type of parameter.

11. (Amended) A sound signal analyzing method comprising the steps of:

receiving a sound signal;

extracting a characteristic of the sound signal received by said step of receiving; and

setting various parameters for use in analysis of the sound signal received by said step of receiving, in accordance with the characteristic of the sound signal extracted by said step of extracting,

wherein, at said step of extracting, extracting at least one of a volume level of the sound signal and upper and lower pitch limits of the sound signal as said characteristic, and

wherein, at said step of setting, setting a threshold value for use in the analysis of the sound signal, in accordance with the volume level of the sound signal extracted by said step of extracting, or setting a filter characteristic for use in the analysis of the sound signal, in accordance with the upper and lower pitch limits extracted by said step of extracting.

14. (Amended) A machine-readable medium containing a group of instructions of a sound signal analyzing program for execution by a computer, said sound signal analyzing program comprising the steps of:

receiving a sound signal;

extracting a characteristic of the sound signal received by said step of receiving; and

setting various parameters for use in analysis of the sound signal received by said step of receiving, in accordance with the characteristic of the sound signal extracted by said step of extracting,

wherein, at said step of extracting, extracting at least one of a volume level of the sound signal and upper and lower pitch limits of the sound signal as said characteristic, and

wherein, at said step of setting, setting a threshold value for use in the analysis of the sound signal, in accordance with the volume level of the sound signal extracted by said step of extracting, or setting a filter characteristic for use in the analysis of the sound signal, in accordance with the upper and lower pitch limits extracted by said step of extracting.